

Section 3-5: Proportions

By the end of this lesson, you should be able to answer:

- How do you write and solve proportions?

Where you might see this in the real world:

- Art, machinery, manufacturing, business, physics, retail

Define the following terms:

1. Proportion
2. Means
3. Extremes
4. Cross-products

A proportion is nothing more than the comparison between two ratios. In a true proportion, the ratios will be equal to each other. There are three different ways you will see proportions written:

$$a \text{ is to } b \text{ as } c \text{ is to } d \qquad a : b = c : d \qquad \frac{a}{b} = \frac{c}{d}$$

a and d are the **extremes**, as they are to the **extreme** outside of the ratio. What does this **mean**? We're left with the **means** on the inside of the ratio.

To check to see if we have true proportions, we use cross-multiplication. To do this, we set the product of the extremes equal to the product of the means. This idea is used in solving proportions.

Example 1: Solve the proportion and check the solution.

$$\text{a. } \frac{x}{24} = \frac{24}{36} \qquad \text{b. } \frac{14}{x} = \frac{28}{12}$$

When dealing with real world situations with proportions, it is important to set up our ratios in the same way.

Example 2: The cheese that Fuzzy Jeff bought contains about 80 calories in 15 g. Fuzzy Jeff ate 75 g of the cheese. About how many calories was that?

Notice that in example 2, we set up our ratios as calories to grams. When we then set up our proportion, we had a true proportion.

Example 3: Solve the proportion and check.

$$\frac{8}{x+3} = \frac{48}{60-x}$$

Problem Set:

"Far better it is to dare mighty things, to win glorious triumphs even though checkered by failure, than to rank with those poor spirits who neither enjoy nor suffer much because they live in the gray twilight that knows neither victory nor defeat." - Theodore Roosevelt